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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/759,102	01/20/2004	Kazuya Miwa	101175-00045	6932

7590 05/15/2008
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Washington, DC 20036-5339

EXAMINER

ALEJANDRO, RAYMOND

ART UNIT	PAPER NUMBER
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1795

MAIL DATE	DELIVERY MODE
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05/15/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/759,102	Applicant(s) MIWA, KAZUYA	
	Examiner Raymond Alejandro	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2008 and 22 April 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 November 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submissions filed on 04/14/08 and 04/22/08 have been entered.

This Examiner's letter is in reply to the amendment in connection with the filing of the foregoing RCE. The applicant has overcome the 35 USC 112 rejections and the art rejections as previously presented. Refer to the abovementioned amendment for substance of applicant's rebuttal arguments and remarks. However, the present claims (including newly added claims 15-26) are again rejected over new grounds of rejection as composed infra and for the reasons of record:

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

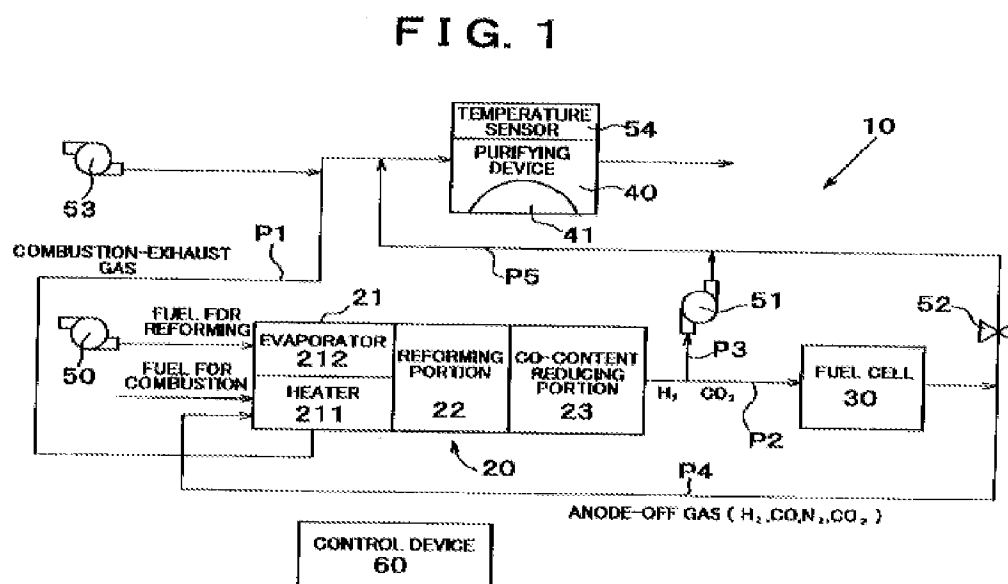
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. (at least) Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Ogino
2002/0031453.

The objective of the present invention is directed to a hydrogen supply unit wherein the disclosed inventive concept comprises the specific purification means.

Ogino discloses a systems for purifying exhaust gas emission from fuel reforming device (TITLE) including a fuel reforming device 20 wherein the outlet thereof is in direct communication with a fuel cell 30 which supplies the exhaust gas of the fuel cell to a purifying device 40 (P0018/ FIGURE 1).

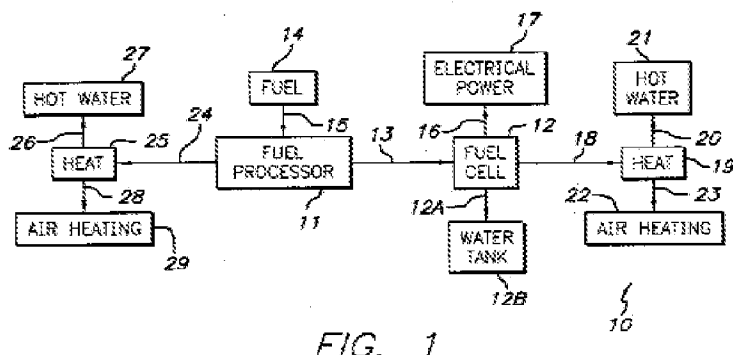


Thus, Ogino anticipates the present claim.

3. (at least) Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Parchamazad 2004/0081861.

Parchamazad discloses a fuel cell power generating system including a fuel processor 11 which directly supplies reformed gas to the fuel cell 12 via line 13, and wherein the exhaust of the fuel cell is further supplied to water tank 12B and/or heat source 19 (FIGURE 1). *Any one of*

water tank 12B and/or heat source 19 can act as the purification element for purifying hydrogen in an exhaust gas regardless of its particular functionality.

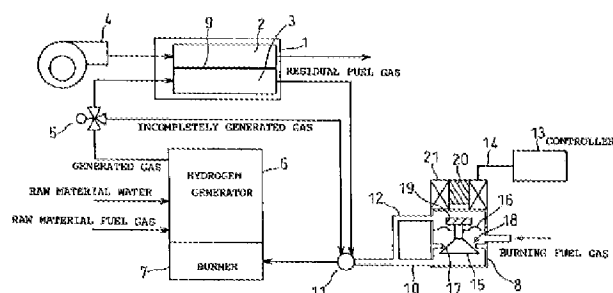


Thus, Parchamazad anticipates the present claim.

4. (at least) Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Ukai et al 2003/0035983.

Ukai et al disclose a hydrogen generator 6 comprising a reformer (P0055); a fuel cell 1 directly connected with a downstream outlet of the reformation means (P0055); and a burner 7 receiving exhaust from the fuel cell (P0003). *It is noted that Burner 7 can act as the purification element for purifying hydrogen in an exhaust gas regardless of its particular functionality. Burner 7 is further processing the discharged hydrogen.*

FIG. 1



Thus, Ukai et al anticipates the present claim.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1-4, 6-10, 13, 15, 17 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keefer et al 2006/0182680 in view of Ogino 2002/0031453.

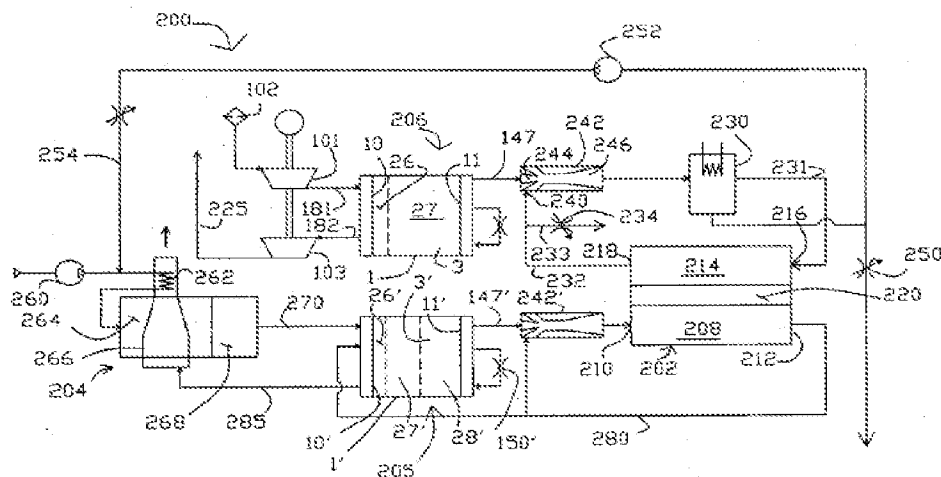
With regard to claims 1, 19-20:

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Keefer et al disclose a system and process for providing hydrogen to fuel cells (TITLE/Abstract) including a steam reforming fuel processor 204, a fuel cell 202, and a hydrogen purification PSA system 205 (*PSA stands for pressure swing adsorption*) (P0096/CLAIM 18). Reforming is used to generate hydrogen (P0004, 0103), and the fuel cell provides a source of electrical current (P0003). It is evident from **Figure 6** below that the hydrogen purification PSA system 205 is both upstream and downstream of the fuel cell 202 (See FIGURE 6). *Thus, it also receives the anode exhaust of the fuel cell.* **FIGURES 7-9** also depict other fuel cell power plant systems. Keefer et al disclose substitution or combined use of any type of hydrogen purification unit such as gas separation devices including other types of adsorption modules or gas membrane separation systems (P0095 & 0005).

(Emphasis added→) From **FIGURE 6**, it can be appreciated that "exhaust gas" in line 280 only comes from the fuel cell (See FIGURE 6) as instantly claimed.

FIG. 6



With regard to claims 2-4, 15:

Keefer et al disclose a hydrogen purification PSA system 205 (*PSA stands for pressure swing adsorption*) (P0096/CLAIM 18). Keefer et al further teach substitution or combined use of

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any type of hydrogen purification unit such as gas separation devices including other types of adsorption modules or gas membrane separation systems (P0095 & 0005). Ejector 242' (P0101) or even the conduit line (P0101) itself can act as the pressurizer.

With regard to claims 6, 13, 17:

The hydrogen purification PSA system 205 comprises plural zones and adsorbent materials for hydrogen purification (P0100 & 0103).

With regard to claims 7-8:

Keefer et al disclose using a steam reforming fuel processor 204 (P0096/CLAIM 18); or alternative fuel processors such as an autothermal or partial oxidation reactors for processing of hydrocarbon fuels to generate hydrogen rich reformat (P0103). Reforming is used to generate hydrogen (P0004, 0103), and the fuel cell provides a source of electrical current (P0003). *Steam and autothermal reforming encompass the use or transfer of heat.*

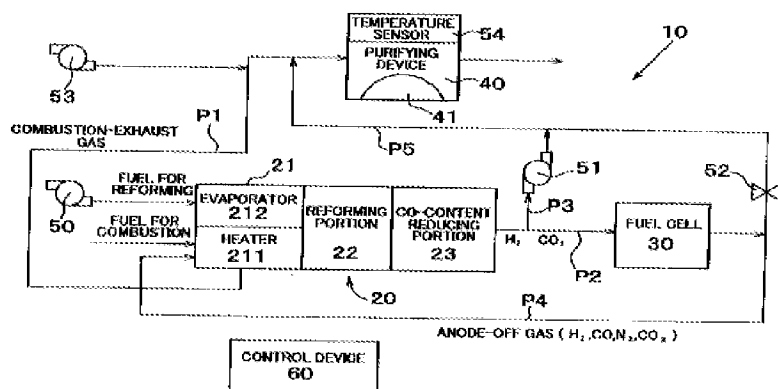
With regard to claims 9-10:

Keefer et al discuss purification and storage of hydrogen either as compressed gas or cryogenic liquid; and distribution of said hydrogen to a fuel cell vehicle (P0004).

Keefer et al disclose a hydrogen supply unit as discussed above. However, the preceding reference does not expressly disclose the fuel cell in direct communication with a downstream outlet of the reformation means.

Ogino discloses a systems for purifying exhaust gas emission from fuel reforming device (TITLE) including a fuel reforming device 20 wherein the outlet thereof is in direct communication with a fuel cell 30 which supplies the exhaust gas of the fuel cell to a purifying device 40 (P0018/ FIGURE 1).

FIG. 1



In view of the above, it would have been obvious to a person of ordinary skill in the pertinent art at the time the invention was made to have Keefer's fuel cell in direct communication with a downstream outlet of the reformation means as taught by Ogino et al because Ogino et al disclose the fuel cell is adapted to receive as a fuel the reformed gas supplied from the fuel reforming device to generate electric energy. Thus, Ogino et al teaches the adaptability and suitability of directly supplying reformed gas from the reformer to the fuel cell for power generation purposes.

9. Claims 1-4, 6-10, 13, 15, 17 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keefer et al 2006/0182680 in view of Parchamazad 2004/0081861.

With regard to claim 1 and 19-20:

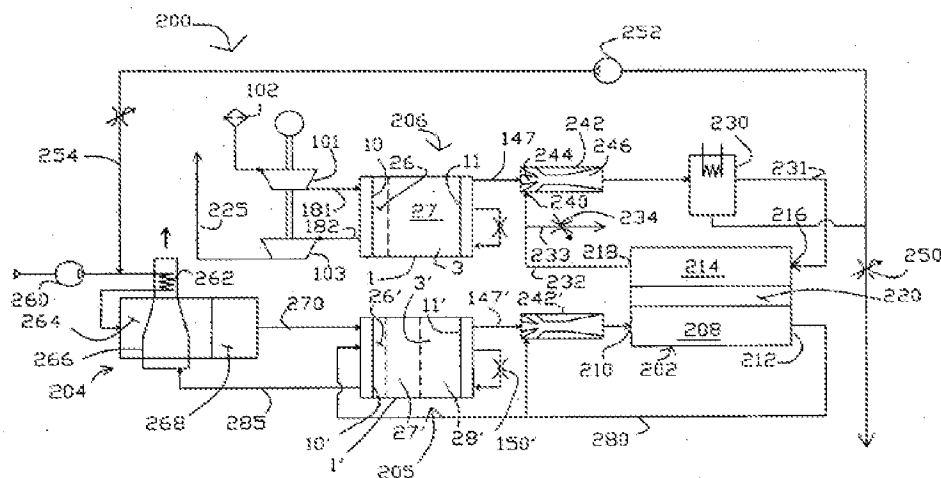
Keefer et al disclose a system and process for providing hydrogen to fuel cells (TITLE/Abstract) including a steam reforming fuel processor 204, a fuel cell 202, and a hydrogen purification PSA system 205 (*PSA stands for pressure swing adsorption*) (P0096/CLAIM 18). Reforming is used to generate hydrogen (P0004, 0103), and the fuel cell provides a source of electrical current (P0003). It is evident from **Figure 6** below that the

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hydrogen purification PSA system 205 is both upstream and downstream of the fuel cell 202 (See FIGURE 6). Thus, it also receives the anode exhaust of the fuel cell. FIGURES 7-9 also depict other fuel cell power plant systems. Keefer et al disclose substitution or combined use of any type of hydrogen purification unit such as gas separation devices including other types of adsorption modules or gas membrane separation systems (P0095 & 0005).

(*Emphasis added*→) From FIGURE 6, it can be appreciated that "exhaust gas" in line 280 only comes from the fuel cell (See FIGURE 6) as instantly claimed.

FIG. 6



With regard to claims 2-4 and 15:

Keefer et al disclose a hydrogen purification PSA system 205 (*PSA stands for pressure swing adsorption*) (P0096/CLAIM 18). Keefer et al further teach substitution or combined use of any type of hydrogen purification unit such as gas separation devices including other types of adsorption modules or gas membrane separation systems (P0095 & 0005). Ejector 242' (P0101) or even the conduit line (P0101) itself can act as the pressurizer.

With regard to claims 6, 13 and 17:

The hydrogen purification PSA system 205 comprises plural zones and adsorbent materials for hydrogen purification (P0100 & 0103).

With regard to claims 7-8:

Keefer et al disclose using a steam reforming fuel processor 204 (P0096/CLAIM 18); or alternative fuel processors such as an autothermal or partial oxidation reactors for processing of hydrocarbon fuels to generate hydrogen rich reformat (P0103). Reforming is used to generate hydrogen (P0004, 0103), and the fuel cell provides a source of electrical current (P0003). *Steam and autothermal reforming encompass the use or transfer of heat.*

With regard to claims 9-10:

Keefer et al discuss purification and storage of hydrogen either as compressed gas or cryogenic liquid; and distribution of said hydrogen to a fuel cell vehicle (P0004).

Keefer et al disclose a hydrogen supply unit as discussed above. However, the preceding reference does not expressly disclose the fuel cell in direct communication with a downstream outlet of the reformation means.

Parchamazad discloses a fuel cell power generating system including a fuel processor 11 which directly supplies reformed gas to the fuel cell 12 via line 13, and wherein the exhaust of the fuel cell is further supplied to water tank 12B and/or heat source 19 (FIGURE 1). *Any one of water tank 12B and/or heat source 19 can act as the purification element for purifying hydrogen in an exhaust gas regardless of its particular functionality.*

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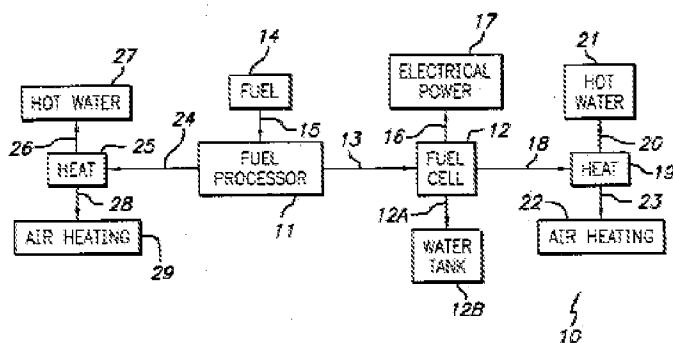


FIG. 1

In view of the above, it would have been obvious to a person of ordinary skill in the pertinent art at the time the invention was made to have Keefer's fuel cell in direct communication with a downstream outlet of the reformation means as taught by Parchamazad because Parchamazad discloses the fuel cell is adapted to receive as a fuel the reformed gas supplied from the fuel reforming device to generate electric energy. Thus, Parchamazad teaches the adaptability and suitability of directly supplying reformed gas from the reformer to the fuel cell for power generation purposes.

10. Claims 5, 12 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over: a) Keefer et al 2006/0182680 in view of Ogino 2002/0031453, and/or b) Keefer et al 2006/0182680 in view of Parchamazad 2004/0081861 as applied to claims 3-4 and 15 above, and further in view of Carr et al 4233132.

Keefer et al, Ogino and/or Parchamazad are applied, argued and incorporated herein the reasons expressed above. However, the preceding prior art references do not expressly disclose the specific membrane separator.

Carr et al disclose an apparatus for producing (purifying) hydrogen comprising electrodes being separated by a material and means for imposing electrical potential across the electrode for generating hydrogen (ABSTRACT/CLAIM 13).

With these teaching, it would have been obvious to a person of ordinary skill in the pertinent art at the time the invention was made to incorporate the specific membrane separator of Carr et al into the fuel cell system of Keefer et al, Ogino and/or Parchamazad as Carr et al discloses that it is known to use the above hydrogen membrane separator for continuously producing a suitable quantity of hydrogen which is separately collected and usable in gaseous form. Thus, Carr et al's hydrogen purification/generating apparatus assists in the generation, production or purification of hydrogen.

11. Claims 11, 14, 18 and 21-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over: a) Keefer et al 2006/0182680 in view of Ogino 2002/0031453, and/or b) Keefer et al 2006/0182680 in view of Parchamazad 2004/0081861 as applied to claims 3-4 above, and further in view of Applicant's Admission of Prior Art (heretofore the AAPA) (*Applicant's specification, page 2, lines 1-8*).

Keefer et al, Ogino and/or Parchamazad are applied, argued and incorporated herein the reasons expressed above.

As to claims 11 and 14:

Keefer et al discuss purification and storage of hydrogen either as compressed gas or cryogenic liquid; and distribution of said hydrogen to a fuel cell vehicle (P0004). Ejector 242'

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(P0101) or even any of the conduit lines (P0101) itself can act as the pressurizer. *Keefer et al readily envisions hydrogen storage for use in a fuel cell vehicle.*

However, the preceding prior art reference does not expressly disclose the specific first tank for storing hydrogen.

The AAPA discloses that it is known to include a storage tank 35 for storing the hydrogen purified by the purifier 33 and the hydrogen which has not been used in the fuel cell (*Applicant's specification, page 2, lines 1-8*).

With these teaching, it would have been obvious to a person of ordinary skill in the pertinent art at the time the invention was made to incorporate the specific first tank for storing hydrogen of the AAPA into the fuel cell system of Keefer et al, Ogino and/or Parchamazad as the AAPA discloses that such a storage tank is useful for storing the hydrogen purified by the purifier and the hydrogen which has not been used in the fuel cell. Thus, the storing tank provides the benefit of storing hydrogen.

Response to Arguments

12. Applicant's arguments with respect to claims 1-26 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Raymond Alejandro/
Primary Examiner, Art Unit 1795

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